DELIBERATIVE

BIOLOGICAL ASSESSMENT

POWERTECH'S DEWEY-BURDOCK IN-SITU URANIUM RECOVERY PROJECT SITE CUSTER AND FALL RIVER COUNTIES, SOUTH DAKOTA

AREA DRAFT PERMITS SD31231-00000 and SD52173-00000

LOCATION:

Portions of Sections 1-5, 10-12, 14 and 15, Township 7 South, Range 1 East, Fall River County
Sections 20,21, and 27-35, Township 6 South, Range 1 East, Custer County

West Bounding Coordinate: -104.06
East Bounding Coordinate: -103.94
North Bounding Coordinate: 43.52
South Bounding Coordinate: 43.44

PERMIT APPLICANT

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Prepared for:

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May 22, 2019

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ABBREVIATIONS

BLM – U.S. Bureau of Land Management
BME – Board of Minerals and Environment
DOI – U.S. Department of Interior
ISR – In-Situ Uranium Recovery
ECOS – USFWS Environmental Conservation Online System
EIS – Environmental Impact Statement
EPA – U. S. Environmental Protection Agency
ESA – Endangered Species Act
GEIS – Generic Environmental Impact Statements
IPaC – USFWS Information, Planning, and Conservation System
ISR – In Situ Recovery, In Situ Leach Mining
NEPA – National Environmental Protection Act
NRC – Nuclear Regulatory Commission
pCi/L – picocuries per liter
Powertech – Azarga Uranium Corporation, Powertech (USA) Inc.
SDDENR – South Dakota Department of Environment and Natural Resources
SDGFP – South Dakota Game, Fish & Parks
SDWA – Safe Drinking Water Act
SEIS – Supplemental Environmental Impact Statement
SPAW – US Department of Agriculture Soil-Plant-Atmosphere-Water Model
UIC – Underground Injection Control
USDW – Underground Source of Drinking Water
USFWS – Department of the Interior, Fish and Wildlife Service, FWS, U.S. Fish and Wildlife Service, Service
USGS – U.S. Geological Survey

FEDERAL PROTECTIONS

The Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.)
Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-667e)
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712)
Bald and Golden Eagle Protection Act 1962 (16 U.S.C. 668-668c)
National Environmental Policy Act of 1969

I. INTRODUCTION

The purpose of this biological assessment is to address the effects that the Azarga Uranium Corporation's, dba Powertech (USA) Inc. (Powertech), Dewey-Burdock ISR Project may have on species listed as endangered or threatened under the Endangered Species Act (ESA), and their designated critical habitat. The Environmental Protection Agency (EPA) must issue two permit decisions for Underground Injection Control (UIC) wells under the Safe Drinking Water Act (SDWA).

The project involves injection of a lixiviant into the subsurface to mobilize uranium for the purpose of recovery. It also involves injection of waste from the project into the subsurface. This project could impact the following ESA-listed species that have the potential to be in the project area:

Northern Long-eared Bat (*Myotis septentrionalis)*
Rufa Red Knot (*Calidris canutus rufa*)
Whooping Crane (*Grus americana*)

This biological assessment is prepared in accordance with the following authorities:

- Section 7 of the Endangered Species Act, 16 U.S.C. §1536 (a)(2), which requires that agencies must insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species;

- Section 7 of the Endangered Species Act, 16 U.S.C. §1536 (c), which requires Federal agencies to contact the U.S. Fish and Wildlife Service (USFWS) for information on threatened, endangered, or proposed species that may be present in the project area, and in the event they may be in the area, to conduct a biological assessment to identify those likely to be affected by such action; and

- 40 C.F.R. §144.4 (c), which directs the EPA Regional Administrator to follow the ESA section 7 requirements if applicable.

The purpose of the proposed action is to allow for the recovery of uranium from the subsurface. In order to do this, Powertech will need to inject lixiviant to mobilize the uranium. The SDWA and its implementing regulations regulate injection into the subsurface to prevent endangerment to underground sources of drinking water (USDWs). The UIC program prevents endangerment by prohibiting unauthorized injection into USDWs and authorizing injection by permit or rule that will not endanger USDWs. Because the project includes injection of lixiviant and waste into the subsurface, Powertech is required to obtain permits from the EPA to comply with the SDWA.

A. RELATED STATE AND FEDERAL PERMIT ACTIONS

Powertech applied to South Dakota Department of Environment and Natural Resources' (SDDENR) Minerals and Mining Division for a large scale mine permit in October 2012. SDDENR reviewed the application and supplemental information and recommended conditional approval in April 2013. The Board of Minerals and Environment (BME) delayed a scheduled November 2013 hearing until the Nuclear Regulatory Commission (NRC) and the EPA determined and set federal surety and the state allocated water rights to the project. The NRC issued Powertech a source material license April 8, 2014, authorizing

Powertech to extract uranium from the Dewey-Burdock site. Powertech estimates they will produce one million pounds of uranium oxide (U3O8) over a 20-year period.

II. PROJECT DESCRIPTION

Powertech's Dewey-Burdock ISR proposed project site encompasses 4,282 hectares or 10,580 acres of predominantly private land on the southern edge the of Black Hills. Approximately 2,619 acres are expected to be affected by surface disturbance-related activities including those associated with Class III and V injection well operations described below. The site is approximately 13 miles northwest of Edgemont and 46 miles west of the Pine Ridge Reservation. It straddles the northwest corner of Custer and the southwest corner of Fall River counties between the small towns of Dewey to the northwest and Burdock to the southeast. The Town of Burdock is within the project area.

Powertech proposes to construct surface infrastructure and wells in the Dewey-Burdock project area to support in situ recovery (ISR) of uranium. This includes injection, recovery, and monitoring wells in 14 well fields and up to six wells for wastewater disposal associated with the mining operation. The wells which are used to inject fluids (lixiviant) to dissolve the minerals are classified as Class III UIC wells. The wells which are used to dispose of non-hazardous fluids from this operation are classified as Class V wells. The EPA's Underground Injection Control (UIC) division has permitting authority in South Dakota for Class III injection and Class V wastewater disposal wells.

Powertech is currently pursuing the EPA UIC Class III and V permits needed to begin mining. The EPA has three distinct actions for this project under the SDWA UIC program: a UIC Class III area permit for injection of lixiviant into the uranium ore zone, an aquifer exemption for the Class III injection area, and a Class V area permit for the disposal of wastewater from the proposed uranium mining operation. On March 6, 2017, the EPA issued a draft UIC Class III Area Permit for the wells associated with the recovery of uranium in the Inyan Kara Group aquifers, and a draft UIC Class V Area Permit for deep injection wells for disposal of treated ISR waste fluids into the Minnelusa Formation.

A. IN-SITU RECOVERY OF URANIUM – CLASS III UIC WELLS AND ASSOCIATED PRODUCTION AND MONITORING WELLS

The ISR or solution mining process of uranium, which is described below, is suitable when certain geologic and hydrological features prevail including at the Dewey-Burdock project site. The uranium ore body locations for this project are shown in Figure 1. The color of the ore body represents its location within the Inyan Kara aquifers: Lower Fall River (blue), Upper Chilson (green) and Lower/Middle Chilson (red).

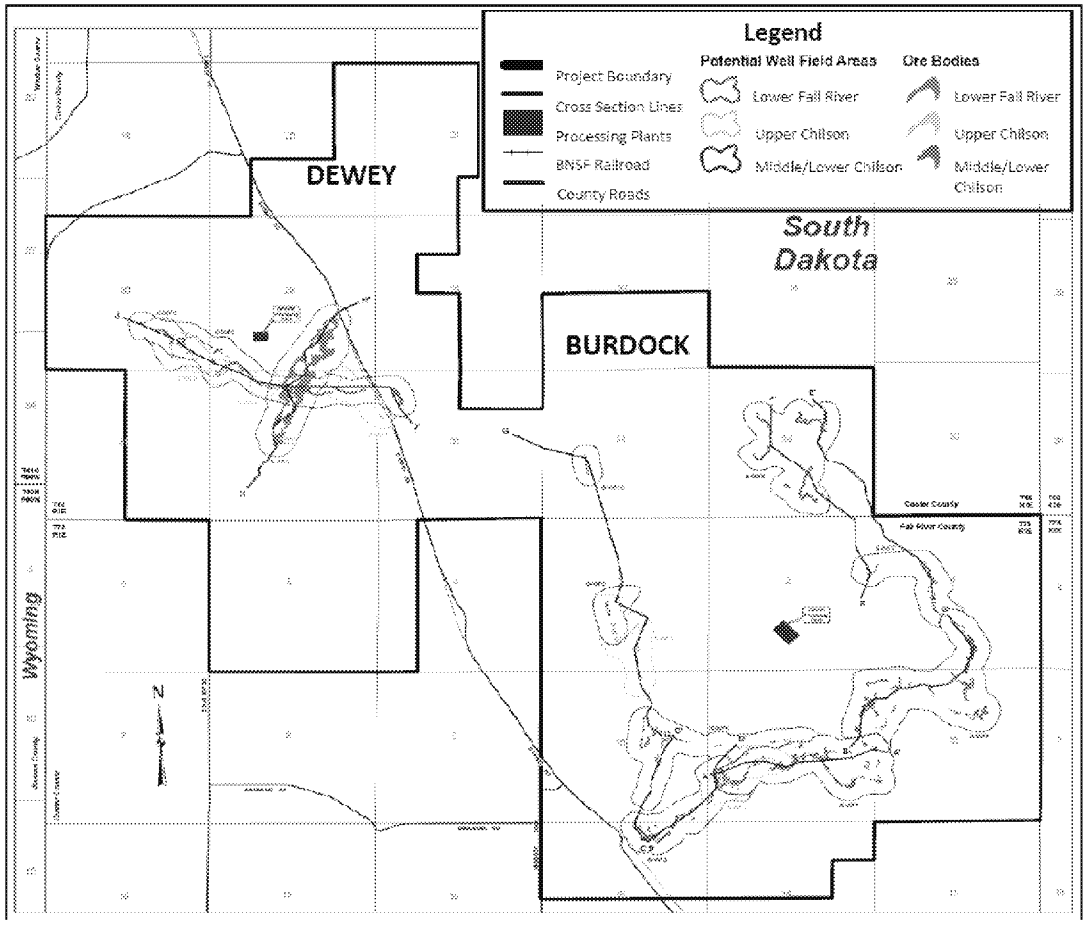

Figure 1. Ore Body Locations Relative to the Aquifer, Dewey-Burdock Permit Area, Processing Facilities

Powertech proposes recovering the uranium from the ore bodies by injecting a liquid medium known as lixiviant into an array of Class III wells constructed in the Inyan Kara Group, more specifically in the Lakota Formation Chilson Sandstone and the overlying Fall River Formation Figure 2 below shows the geologic formations present in the project area and the location below ground surface of the Lakota and Fall River formations.

The proposed lixiviant uses groundwater from the uranium-bearing aquifer; gaseous oxygen is added to mobilize uranium from the ore bodies into solution, and gaseous carbon dioxide is added to hold the uranium in solution while it flows to production wells. The resulting uranium rich solution is drawn to production wells by pumping and then transferred to a processing facility through a network of underground pipelines.

In order to inject the lixiviant into the subsurface, Powertech is required to get a Class III permit from the EPA prior to construction and operation of the wells. Powertech submitted to the EPA a UIC Class III Permit Application and an aquifer exemption request[1] to develop 14 ISR uranium wellfields on its property

[1] An aquifer exemption to exempt the injection formation from protection as a USDW is necessary because the Inyan Kara Group of aquifers are USDWs. Injection of fluids into a USDW via Class III wells is prohibited under 40 CFR § 144.12. Therefore, Powertech has applied for an aquifer exemption under 40 CFR § 146.4 .

in Fall River and Custer counties, South Dakota. Ten wellfields are proposed for the Burdock area and four for the Dewey area. The Class III Area Permit does not limit the number of injection and production wells Powertech may construct. Each wellfield would have up to several hundred wells operating interchangeably as production or injection wells. The typical development pattern would have four injection wells operating for every one production well in a "five-spot" square pattern with the production well in the center and four injection wells surrounding it oriented in four corners of the square. The project proposes that the wellfields will be constructed and operated sequentially, not simultaneously. Table 1 enumerates the wellfields. Figure 3 shows their proposed locations within the project areas.

Initial construction includes fourteen Class III wellfields, Class III injection and production wells, up to six Class V injection wells, monitoring wells, two processing plants, and nine wastewater treatment and storage ponds. Land application areas with center pivot irrigation systems and storage ponds would be constructed as needed.

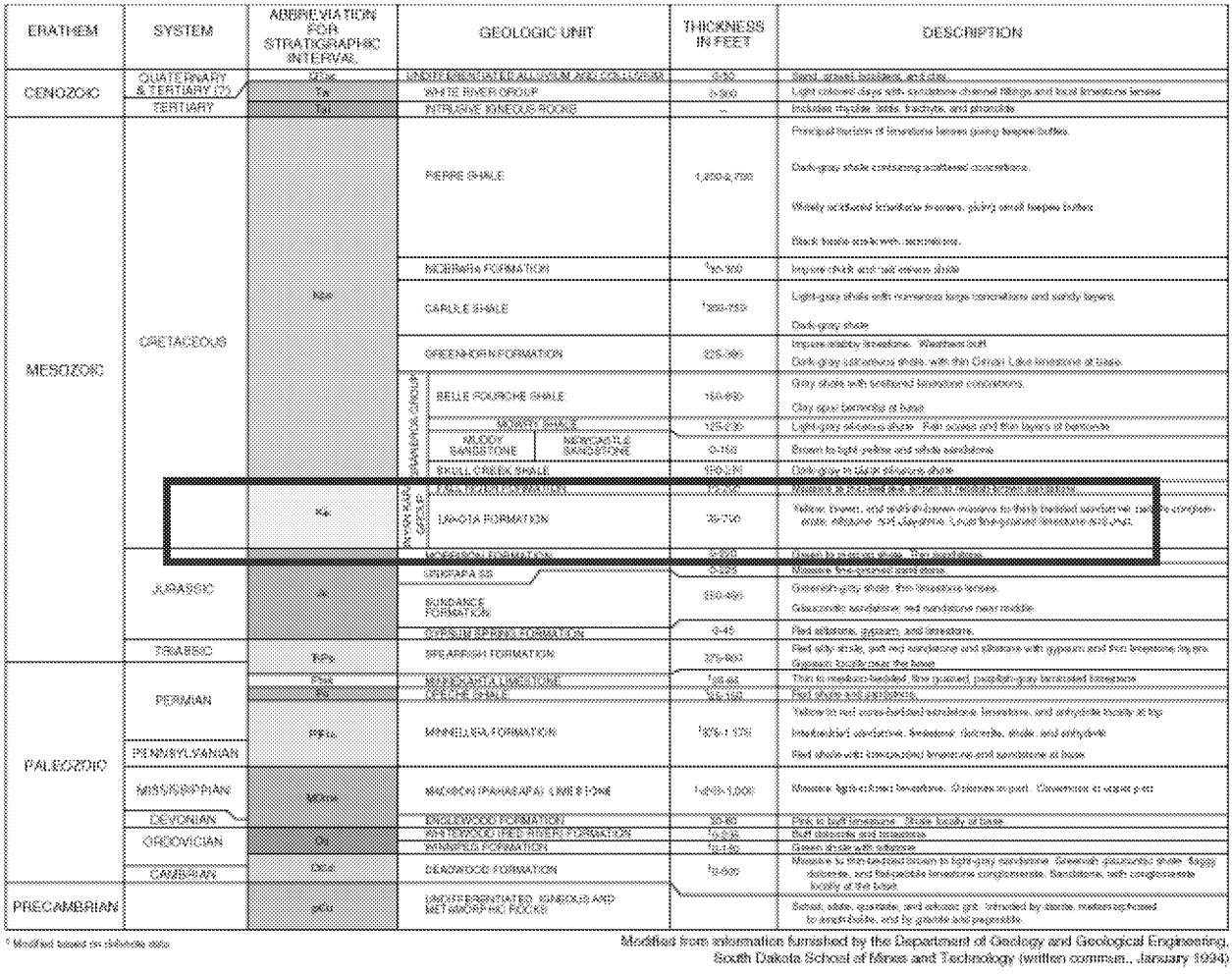

Figure 2. Stratigraphic Column Showing the Geologic Formations at the Dewey-Burdock Project Site

Three types of wells will be installed in each wellfield: injection wells, production wells and monitoring wells. After uranium removal, the uranium depleted lixiviant will be re-fortified with oxygen and carbon dioxide, recirculated and reinjected back into the wellfield via the Class III injection wells. During groundwater restoration, these wells will be used to inject clean water into the aquifer. Production wells will extract uranium-bearing lixiviant from the aquifers. During groundwater restoration, the wells will pump

groundwater out of the wellfields. In the event of a groundwater sweep during restoration, no fluids will be injected, and the production wells will pump groundwater out of the wellfield either to a deeper aquifer, an adjacent wellfield where mining is being initiated, or to surface ponds where it can evaporate. Monitoring wells will be placed in the overlying and underlying aquifers to detect the potential vertical migration of lixiviant outside the production zone. The will be located around each wellfield 400 feet from the nearest Class III injection wells. The monitoring wells will be regulated both by the EPA UIC permit and the NRC license.

Wellfield Permit Number	Wellfield Name	Section/Township/Range	County
SD31231-09459	Burdock Wellfield 1	Sections 11 and 12 T7S R1E	Fall River
SD31231-09460	Burdock Wellfield 2	Sections 10, 11, 14 and 15 T7S R1E	Fall River
SD31231-09461	Burdock Wellfield 3	Sections 10 and 11 T7S R1E	Fall River
SD31231-09462	Burdock Wellfield 4	Sections 10 and 11 T7S R1E	Fall River
SD31231-09463	Burdock Wellfield 5	Sections 3 and 10 T7S R1E	Fall River
SD31231-09464	Burdock Wellfield 6	Sections 1, 2, 11 and 12 T7S R1E	Fall River
SD31231-09465	Burdock Wellfield 7	Sections 1 and 2 T7S R1E	Fall River
SD31231-09466	Burdock Wellfield 8	Section 35 T6S R1E	Custer
SD31231-09467	Burdock Wellfield 9	Section 3 T7S R1E	Fall River
SD31231-09470	Burdock Wellfield 10	Section 34 T6S R1E	Custer
SD31231-08351	Dewey Wellfield 1	Sections 29 and 32 T6S R1E	Custer
SD31231-09471	Dewey Wellfield 2	Sections 29, 30, 31, 32 and 33 T6S R1E	Custer
SD31231-09472	Dewey Wellfield 3	Sections 29, 30, 31 and 32 T6S R1E	Custer
SD31231-09473	Dewey Wellfield 4	Sections 29, 30, 31, 32 and 33 T6S R1E	Custer

Table 1. Approximate Locations of the Proposed ISR Wellfields

B. PROCESSING PLANTS

Two processing plants will be constructed: a central processing plant in the Burdock Area and a satellite processing plant in the Dewey Area. **Figure 4** shows the proposed locations for the plants (red rectangles). The central plant will house equipment for all the uranium processing that will be conducted at the project site. Both plants will house the ion exchange columns that will be used to recover uranium from the lixiviant. The uranium-loaded ion exchange resin will be transported by tanker truck from the satellite plant

to the central plant or to another licensed facility for processing. Processing involves stripping the uranium from the loaded resin using a saltwater solution. The resulting barren resin will be used again to recover more uranium from lixiviant. In the central plant, the uranium-bearing solution will go through a precipitation process which will yield a solid uranium oxide known as yellowcake. The yellowcake will be filtered, washed, dried and packaged in sealed containers for shipment via truck to another site where it will be further processed.

C. WASTEWATER DISPOSAL

Liquid waste generated by the Dewey-Burdock Project will be treated and injected into UIC Class V deep injection wells co the Minnelusa Formation. A combination of deep well injection and land disposal may also be considered if the Class V wells do not have the capacity to dispose the full volume of waste fluids.

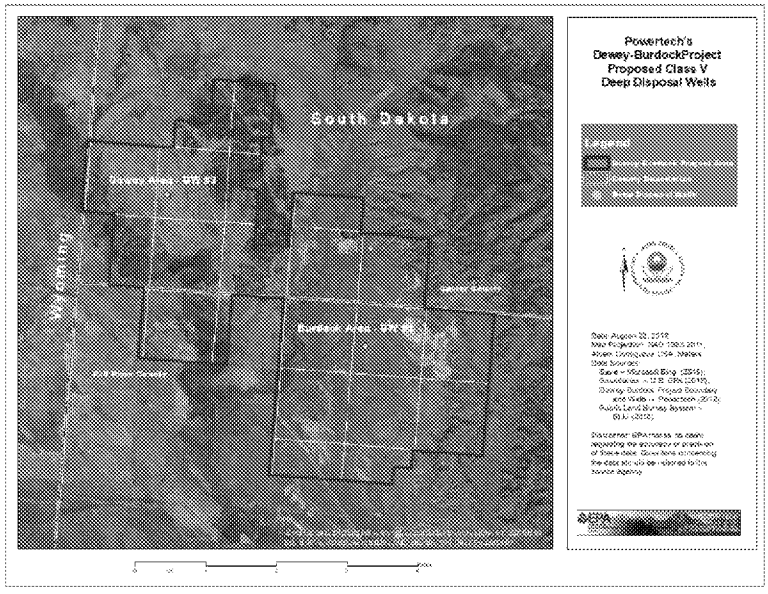

Figure 3. The Proposed Class V Deep Injection Wells.

Well Permit Number	Well Name	Latitude	Longitude	Section/Township/Range	County
SD52173-08764	DW #1	43.469772181	-103.971938654	NENWSW Sec 2 T7S R1E	Fall River
SD52173-08766	DW #3	43.497173752 7	-104.031570321	SENWSW Sec 29 T6S R1E	Custer

Settling, spare, outlet, and surge ponds are planned for each processing facility. The central processing facility will have an additional brine pond as shown in Table 2 below. Each of the spare ponds will provide emergency containment should any of the ponds fail. The settling and spare ponds have the capacity for radium removal of the entire project-wide liquid waste stream at the maximum expected wastewater production rate while maintaining a minimum retention time of 13 days. The outlet ponds will be designed to intercept treated water from the settling ponds and to store storm water from the settling ponds. The surge ponds will contain the treated liquid waste that will be pumped to the deep disposal wells. These ponds can accommodate seven days of produced wastewater. he design of these ponds must comply with EPA and NRC requirements. Powertech plans to construct fences around the treatment and storage ponds. The exact locations of the ponds will not be finalized until Powertech submits a construction design plan to EPA's Air Program.

Type of Pond	Size*	Burdock Central Processing Plant Ponds	Dewey Satellite Processing Plant Ponds
Settling	16 acre-feet	1	1
Spare Containment	16 acre-feet	1	1
Outlet	5 acre-feet	1	1
Surge	8 acre-feet	1	1
Spare Brine	16 acre-feet	1	
**One acre-foot equals about 326,000 gallons, or enough water to cover an acre of land, about the size of a football field, one foot deep. Source: https://www.watereducation.org*			

Table 2. Proposed Ponds for the Treatment and Storage of Wastewater

D. LAND APPLICATION

For land application of fluids, Powertech identified the need for additional storage ponds for treated water during the non-irrigation season, and spare storage ponds for emergency containment should any of the storage ponds fail, or portions of the land application system become temporarily inoperable. Powertech plans to construct fences around the additional storage ponds.

Historically, ISR facilities have used evaporation ponds and surface discharge to manage and dispose of liquid wastes. Treated waste would be applied to an estimated maximum of 1,052 acres areas via center-pivot irrigation systems. The designated land application areas are equally divided between the Dewey and Burdock portions of the permit area, as shown in Table 3 and Figures 4 & 5. Powertech plans to operate these systems 24 hours per day during the growing season from April through October. SDDENR proposes to restrict land application during periods when soils are frozen or snow-covered, generally November through March. During this time treated liquid waste would be stored temporarily in ponds located near the Burdock central plant and Dewey satellite facility. Runoff from precipitation will be directed to catchment areas downgradient of land application areas and allowed to evaporate or infiltrate.

Powertech used the U.S. Department of Agriculture's Soil-Plant-Atmosphere-Water (SPAW) model to estimate the disposal capacity for the land application option. This model predicted that the average annual application rate would be 310 gallons per minute for each application area. It also predicted that approximately 216 acre-feet storage capacity would be needed during winter months. According to Powertech, 510 acre-feet of storage pond capacity will be available.

The land application areas and irrigation systems would be constructed and operated as needed. All designs associated with this option will follow NRC regulations and requirements and will be regulated by SDDENR under a Groundwater Discharge Plan (GDP).

Land Application Proposal for Irrigation Systems	**DEWEY AREA**	**BURDOCK AREA**
Land application area at any given time	315 acres	315 acres
50-acre normally operating pivots	5	6
25-acre normally operating pivots	2	–
15-acre normally operating pivots	1	1
25-acre standby pivots	2	2
15-acre standby pivots	1	1
Catchment Areas*	yes	yes
**Catchment areas will be downgradient of land application areas to collect runoff from precipitation events and will evaporate or infiltrate into the ground. Powertech estimates that the maximum area for land application of treated wastewater will be 1,052 acres.*		

Table 3. Proposed Plan for the Land Application Systems in the Dewey and Burdock Areas

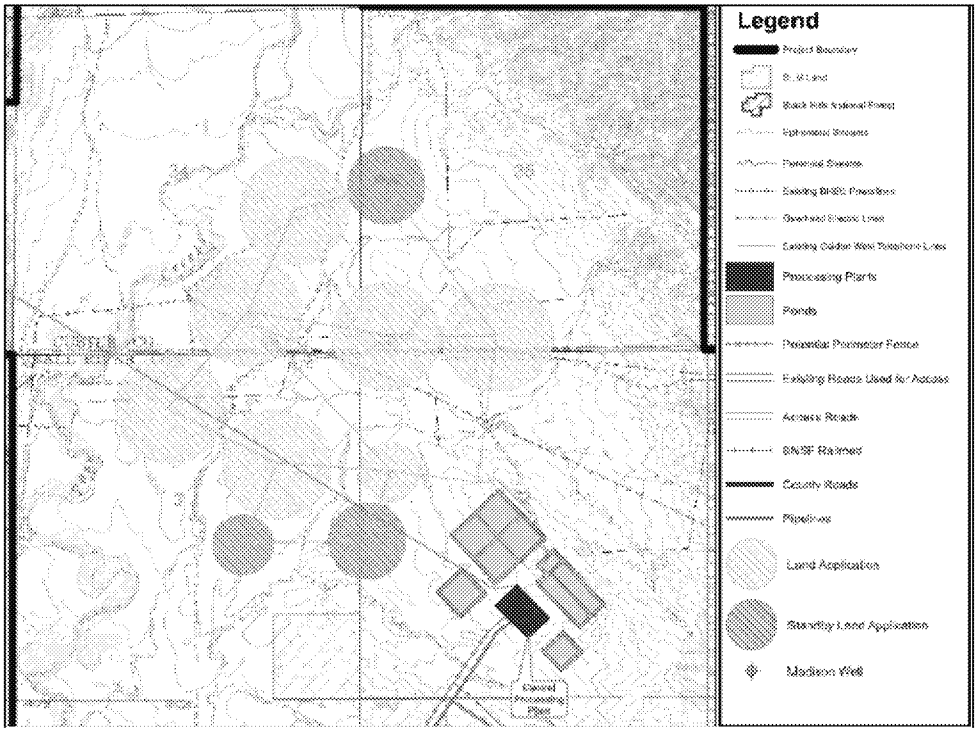

Figure 4. Approximate Location of the Land Application Areas in the Burdock Area

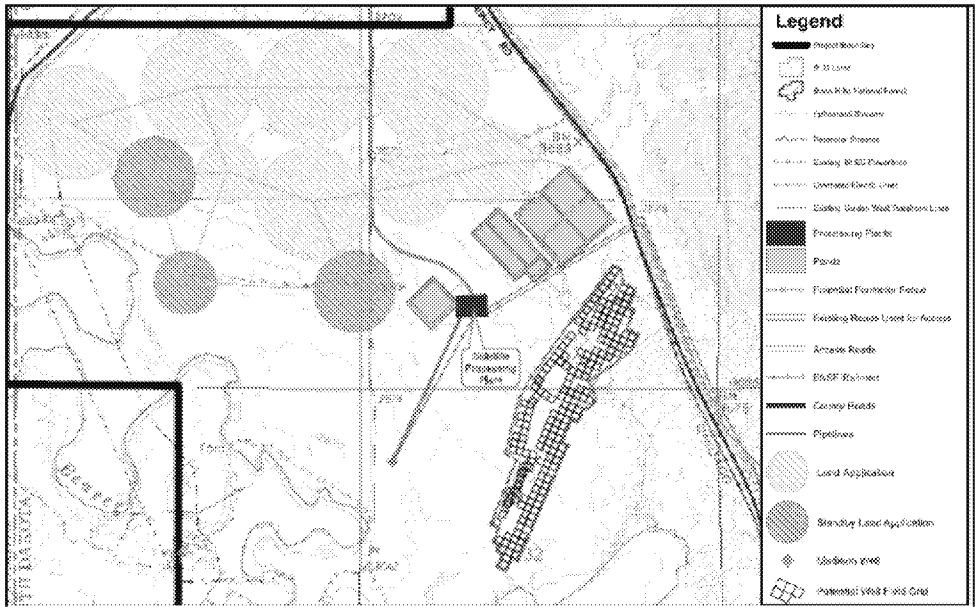

Figure 5. Approximate Location of the Land Application Areas in the Dewey Area

Irrigation areas are situated on flat topography along Pass Creek and its tributaries in the Burdock area and along Beaver Creek and its tributaries in the northwest part of the Dewey area (see Figure 4.5-1(slide #7)). The applicant will apply treated liquid effluents to native vegetation or to existing soil after it has been prepared to grow crops such as alfalfa or salt-tolerant wheatgrass (Powertech, 2012c). Earthmoving activities will not be significant in preparing irrigation areas. Runoff from precipitation events or snowmelt on land application areas will be conveyed to catchment areas downgradient of land application areas and allowed to evaporate or infiltrate (Powertech, 2012c). The soil horizon found throughout most of the project area is clayey (see SEIS Section 3.4.2), which will minimize infiltration and enhance evaporation.

In the license application technical report (Powertech, 2009b, Tables 4.2-7 and 7.3-8) and in its South Dakota GDP (Powertech, 2012c, Table 5.8-2), the applicant described the expected chemical constituents and estimated concentrations in wastewater for the proposed land application activities. The list of chemical constituents includes arsenic, barium, cadmium, chromium, lead, and selenium.

E. ADDITIONAL STRUCTURES

Additional structures necessary for the in-situ process within the permit area include header houses, pipelines, potential water supply wells, access roads, power lines and storage tanks for process chemicals and fuel. All areas where licensed material passes through or is stored will be fenced to limit access. This includes wellfields, treatment ponds, and processing plants.

1. HEADER HOUSES

Header houses distribute injection fluid to injection wells and collect production solution from recovery wells. Typically, one header house will serve up to 20 production wells and 80 injection wells. Additional header houses will be constructed as the wellfield expands. They will be within the fenced wellfields.

2. PIPELINES

The applicant proposes to install up to eight underground pipelines between the Burdock central processing plant and the Dewey satellite facility to transport various fluids used during ISR operations (Powertech, 2011). Conduits for electronic communication and control purposes will also be installed between the central plant and satellite facility. The plant-to-plant pipelines will transport fluids including barren and pregnant lixiviant, restoration water, reverse osmosis reject brines, wastewater from well drilling and maintenance operations, and supply water from the Madison Formation or other aquifers.

3. POTENTIAL MADISON FORMATION WATER SUPPLY WELLS

Powertech has proposed the construction of up to two Madison Formation water supply wells to replace private and stock water wells that will no longer be a supply source when ISR activities begin. Powertech may plug and abandon some of the private and stock wells to maintain hydraulic control of the wellfields.

4. ACCESS ROADS

Powertech intends to utilize all existing roads and construct new roads only as needed to access proposed facilities such as header houses, wellfields not currently accessible by existing roads, and water supply wells.

5. POWERLINES

Powertech plans to use existing power line corridors. However, they anticipate construction of a new electrical substation and a new corridor along Dewey Road between the Dewey and Burdock Areas in Sections 4 and 9, Township 7 North, Range 1 East, to connect the Dewey Satellite Plant and the Burdock Central Processing Plant. Minimal disturbance to the ground surface is anticipated.

6. STORAGE TANKS

Process chemicals will be located either within the Central Processing Plant or in nearby storage facilities. Outdoor chemical storage tanks will be contained within a curbed area designed to accommodate one and one half the capacity of the largest tank to ensure adequate capacity for containment during a potential precipitation event. Fuel storage tanks will also be contained within concrete lined storage facilities.

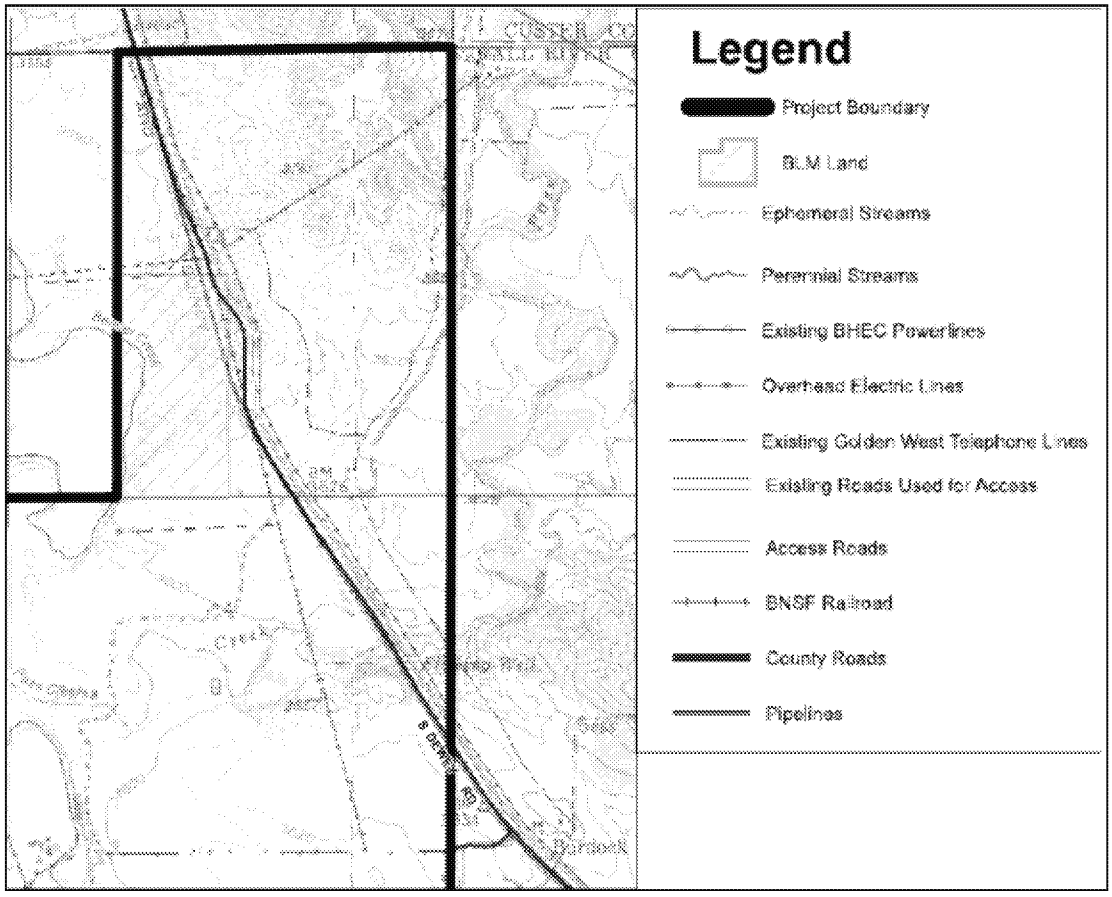

Figure 6. Project-Related Land Disturbance Area for the New Overhead Power Line.

All areas where licensed material passes through or is stored will be fenced to limit access. This includes wellfields and header houses, treatment ponds, and processing plants. Storage tanks and appropriate containment located outside the Central Processing Plant will be enclosed within fenced storage facilities to prevent potential impacts to wildlife.

F. CONSERVATION MEASURES

1. GENERAL MEASURES

General conservation measures Powertech has proposed include controlling erosion, preserving natural vegetation as much as possible, restoring disturbed vegetation, and if land application of wastewater is employed, improving drainage patterns in the affected areas.

Other conservation measures can be found in the U.S. NRC (2014) SEIS, Section 6.2, "Mitigation Measures Proposed by Powertech" and Powertech's (2012) Appendix 3.9-A, "Baseline Wildlife Report." They include the following:

- Measures to Reduce Land Disturbance: minimize road construction and traffic; construct new infrastructure in existing corridors; minimize areal impacts by sequential construction; and use dust control measures such as spraying water on vegetation to protect foraging vegetation. No woody corridors will be disturbed by the proposed activities, and additional trees are present in the

cottonwood gallery along the Cheyenne River, located approximately 2 miles south of the permit area, where mining is not projected to occur in the near future. Few bats were recorded in the proposed permit area despite targeted efforts to observe them during the baseline surveys. Individuals seen were near water bodies and treed habitats, which are not currently scheduled for disturbance.

- Measures to Limit Access to Ponds and Wellfields: fence facilities and ponds; erect temporary fencing around wellfields; and design fences that won't alter habitat or impede wildlife migration.

- Measures to Reduce Soil Disturbance and Contamination: reestablish disturbed vegetation; employ spill monitoring, prevention and cleanup plans for soil contamination; and treat radiological liquid waste injected or applied to land to comply with 10CFR Part 20, Appendix B.

- Measures to Provide Uncontaminated Water: monitor water quality in wells that provide water to livestock and wildlife; and provide other sources of water in the event of a drawdown.

- Measures to Protect Wildlife: Use BMPs for constructing power lines to prevent bird injuries and mortalities; enhance habitats by restoring the land, construct brush and rock piles, leave standing, dead or dying trees; follow a raptor monitoring plan to minimize conflicts with active nests; follow regulatory agency determinations for the timing of project activity and the distance needed between active raptor nests and the project activity; allow snakes and lizards to retreat; and educate employees of the wildlife laws and penalties associated with taking or harassing wildlife, the types of wildlife they are likely to encounter and how to avoid collisions.

In Powertech's Baseline Wildlife Report (2012), contained in the large scale mine permit application they submitted to SDDENR (Appendix 3.9-A), the following mitigation measures were proposed.

- Enforce speed limits to reduce wildlife injuries and mortality caused by collisions with traffic;
- Restore wildlife habitat by reseeding;
- Adequately cover ponds to prevent access by migrating and breeding waterfowl and shorebirds (whooping crane, rufa red knot);
- Replace any jurisdictional wetlands that were disturbed;
- Use existing right-of-way corridors;
- Use Avian Powerline Interaction Committee (APLIC 2006) recommendations for powerline construction; and
- Conduct construction activities outside of breeding season.

III. ACTION AREA

A. GEOGRAPHIC AREA THAT WILL BE AFFECTED

The proposed Dewey-Burdock ISR Project site is in the Nebraska-South Dakota-Wyoming Uranium Milling Region and occupies 10,580 acres in the southwestern corner of Custer County and northwestern corner of Fall River County, South Dakota. The site is approximately 13 miles north-northwest of the city of Edgemont, 40 miles west of the city of Hot Springs, and 50 miles southwest of the city of Custer. The site is on portions of Sections 1-5, 10-12, 14 and 15, Township 7 South, Range 1 East, Fall River County, and Sections 20,21, and 27-35, Township 6 South, Range 1 East, Custer County. According to Powertech, ISR

activities will directly affect approximately 2,528 to 3,793 acres of this area. The acreage depends upon whether Class V well injection alone or a combination of injection and land application is used for wastewater disposal.

The Dewey-Burdock permit area and surrounding one-mile buffer, is located within the Great Plains physiographic province on the edge of the Black Hills in Custer and Fall River Counties, South Dakota. The area contains 10,580 acres of wildlife habitat which supports medium and small-sized mammals, as well as avian species.

The NRC determined that a one-mile effects distance from the boundary of the Dewey-Burdock SDDENR large scale mining permit area would be used to define the action area for the purposes of ESA compliance. Powertech's wildlife surveys and the project area proposed in EPA's Class III and V permit applications corresponded to the same area identified by the NRC.

The Darrow/Freezeout/Triangle uranium mine, which was abandoned in the mid-1980s when uranium prices declined, is in the project area as well as seven other uranium mines identified by the U.S. Geological Survey (USGS).

The geographic area that will be affected is shown in Figures 7 below. Figure 4 and 5 on page 10 show where the proposed land applications, processing plants, ponds and pipelines are located. Figure 3 on page 7 show the location of the proposed Class V deep wells.

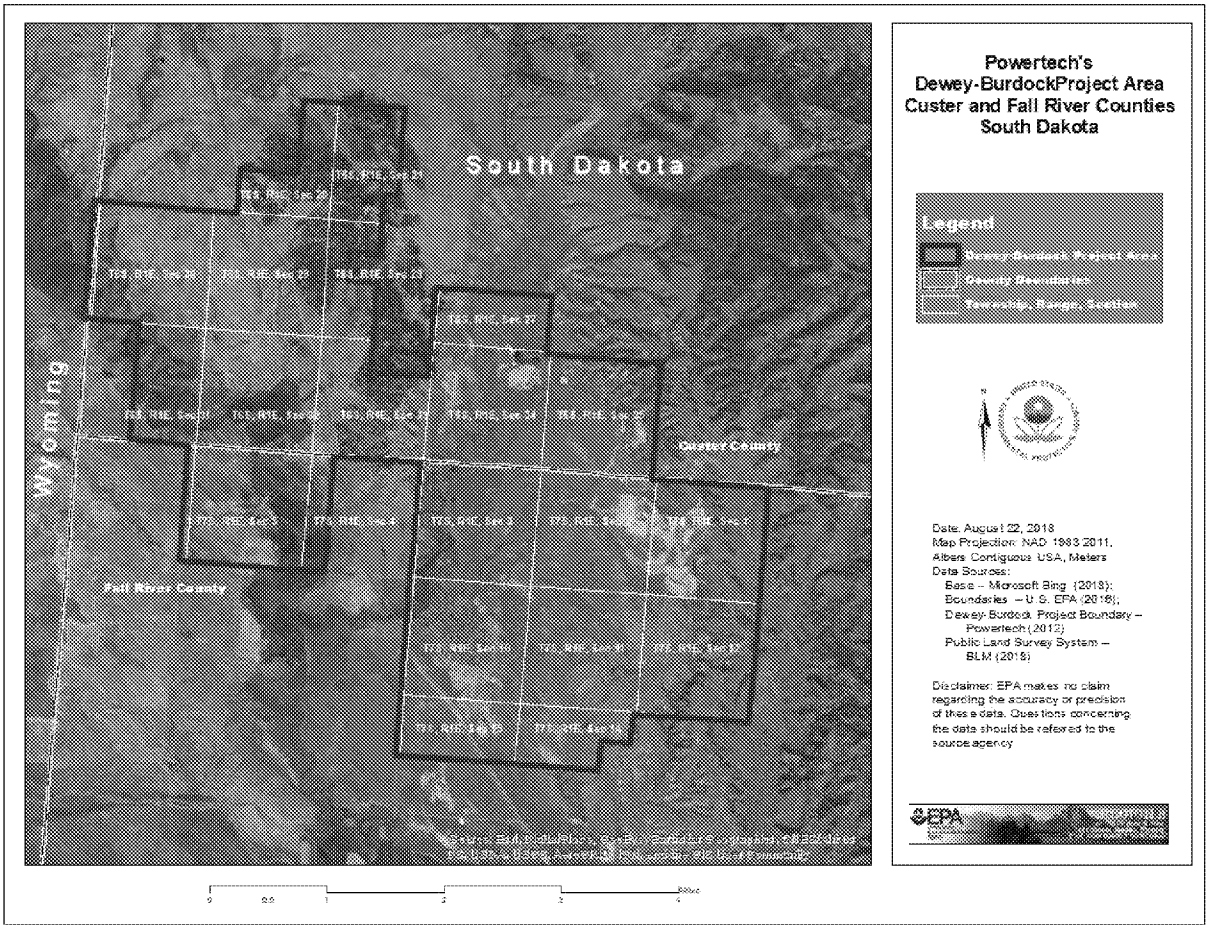

Figure 7. Dewey-Burdock Project Area that will be affected

B. GENERAL ENVIRONMENTAL IMPACTS

Ecological resources in the project action area include vegetation, big game, upland game birds, raptors, waterfowl and shorebirds, nongame and migratory birds, small- and medium-sized mammals, reptiles, amphibians, and protected species.

There are potential environmental impacts on the local ecology from construction, operation, aquifer restoration, and decommissioning at the proposed ISR project area. ISR facility lifecycle phases can have direct and indirect impacts on local habitat and wildlife populations. These impacts can be short-term which can last until successful reclamation is achieved, or long-term which can persist beyond successful completion of reclamation. Indirect impacts could occur when wildlife is displaced by noise, traffic, or other disturbances, and when their forage is reduced due habitat alteration, fragmentation, or loss. Indirect impacts typically continue longer than direct impacts.

Because ISR uranium extraction generally does not involve large-scale habitat alteration, long-term impacts are not expected to be substantial due to the relatively limited habitat disturbance associated with the ISR extraction method.

C. IMPACTS DURING CONSTRUCTION

Activities during this initial phase of the project include constructing two processing plants, well header houses and access roads, developing holding ponds, establishing wellfields, drilling wells, laying pipeline, and adding an overhead powerline.

Wildlife could be affected by increased traffic levels and physical disturbance during the construction phase. As the potential for collisions with construction equipment increases, it is likely that wildlife will sustain more injuries and mortalities than during any of the other of the project phases. Smaller, less mobile species could perish during clearing and grading. Dust from construction deposited on vegetation may affect the ability for obligate species like the sage grouse to forage. Fencing could limit access to water and wintering habitat. The proposed wastewater may contain harmful levels of uranium, arsenic, cadmium, lead, molybdenum, and selenium. Concentrations of these chemical constituents in land application area soils have been known to negatively impact wildlife. The EPA concurs with NRC's determination that impacts to individual animals are possible if controls and practices proposed by Powertech do not limit all direct exposures to undiluted wastewater solutions.

The EPA concurs with NRC's expectation that habitat fragmentation, temporary displacement, and direct or indirect mortalities will be possible, but that wildlife will disperse from the proposed license area as construction activities commence. Direct exposure of wildlife to wastewater must be limited, and under current regulatory controls, environmental concentrations of wastewater constituents are unlikely to reach levels that would lead to destabilization of wildlife populations. The EPA reviewed and concurs with NRC's observations that the potential impact on terrestrial wildlife from construction could be minimal to moderate.

ISR facilities that ranged in size from 2,471 to 17,297 acres with disturbed area estimates of 120 to 1,860 acres were evaluated to measure the impact. The percentage of vegetation removed and land disturbed by construction activities, from less than one percent up to 20 percent, will cause a small impact compared to the total permit area and surrounding plant communities. The clearing of grasses and shrubs is expected to have a short-term, minimal impact, given the rapid colonization of annual and perennial species in the

disturbed areas. Wooded areas could have a long-term impact because of the slower pace of natural revegetation, and impacts could range from small to moderate, depending on the amount of surrounding woody areas.

D. IMPACTS DURING OPERATION / ONGOING ACTIVITIES

During the operation phase of the project, less disturbance to vegetation and wildlife is expected. There will be fewer earthmoving activities and less exposure to noise, vehicles, and humans than during construction.

More disturbance will occur if wastewater is applied to the land April through October via central pivot irrigation systems. Additionally, the wastewater may include levels of harmful constituents with MCLs. Preventative measures, such as fencing, would cut off access to the treatment and holding ponds. Mitigation plans, spill detection and response plans will further reduce the potential impacts to wildlife.

1. CLASS V INJECTION WELL DISPOSAL OPTION

As described by Powertech, injecting ISR wastewater into Class V wells requires the use of settling and holding ponds to treat and store the wastewater. Wildlife may be exposed to harmful contaminants in the ponds. Powertech has proposed predisposal wastewater treatment, including ion-exchange treatment and radium settling, to remove or reduce some of the regulated constituents discharged to the storage ponds.

2. LAND APPLICATION OF ISR WASTEWATER

Temporary contamination or alteration of soils could occur from operational leaks and spills, transportation, and land application of treated wastewater. Selenium was identified by the USFWS as a constituent of concern in ISR wastewater because of a low wildlife health effects threshold in some sensitive species. (USFWS, 2007). An effects threshold is a concentration of a chemical in water that is known to cause health effects in wildlife. Powertech's estimated concentrations of trace metals in soils at the application sites exceeded EPA's ecological soil screening levels (Eco-SSLs) for cadmium, lead, and selenium. Bioaccumulation of these trace metals in the soil can increase their toxicity and adversely affect vegetation and wildlife. Land application of ISR wastewater could negatively affect vegetation from the build-up of metals in the soils. Plant and vegetative forage root systems will take up any contaminants in soil solution. Contaminants can migrate through soil and be transported to shallow groundwater or nearby surface water further increasing wildlife's exposure to harmful constituents.

The potential exists for some wildlife to be exposed to harmful constituents. Detection and response to leaks and spills, soil cleanup, and eventual surveying and decommissioning of all potentially impacted soils will limit the magnitude of the impacts. The estimated 8-year operation period will continuously affect approximately 1,052 acres of vegetation, wildlife distribution, and wildlife habitat. Alterations to the terrestrial environment will be noticeable but impacts to threaten the continued existence of any species are not expected. The EPA concurs with NRC's conclusion that the overall impact on vegetation and wildlife for land application of ISR wastewater will be **moderate**.

E. IMPACTS DURING AQUIFER RESTORATION

During the aquifer restoration phase of the project, less disturbance to vegetation and wildlife is expected. The impacts are similar to those experienced during the operations phase with no major differences in type

or degree of impact. The existing infrastructure will be used during this phase, and mitigation measures will continue to apply for the construction and operations phases. There will be less human presence, less noise, and fewer wildlife mortalities. The EPA concurs with NRC's conclusion that aquifer restoration impacts will be **small** to **moderate**.

Wildlife will continue to be exposed to harmful wastewater constituents. Approximately 1,052 acres of vegetation and wildlife habitat will continue to be altered. Activities will still affect wildlife distribution. The EPA concurs with NRC's conclusion that the overall potential impacts to vegetation and wildlife remain **moderate**. Based on the projected wastewater flow rate of 500 gpm during aquifer restoration relative to 547 gpm during concurrent uranium production and aquifer restoration, the potential impacts to big game, aquatic species, and amphibians during the aquifer restoration phase will not increase beyond those of the operations phase and will be **small**.

F. IMPACTS DURING DECOMMISSIONING

1. CLASS V INJECTION WELLS

During decommissioning, potential impacts from Class V injection well activities include disturbing 243 acres of vegetation, primarily in the upland grassland and greasewood shrubland vegetation communities. Temporary disturbances to land and soils during decommissioning could displace vegetation and wildlife species that had recolonized the proposed project area since initiation of ISR activities. Shrubland vegetative communities will be more difficult to reestablish and achieve full site recovery. Powertech commits to reestablishing vegetation throughout the ISR facility life cycle. However, new vegetative growth could be affected by future grazing, droughts, or intense winters, thus reducing the rate of plant productivity and delaying full recovery. Revegetation and recontouring will restore habitat previously altered during construction and operations.

Potential impacts to wildlife are comparable to those described for the construction phase. The removal of perimeter fencing will increase big game passage and vegetative forage. As with construction, operations, and aquifer restoration phases, potential impacts to big game during decommissioning will remain minimal. Potential impact to aquatic species and amphibians will also remain minimal because of the limited occurrence of surface water, and the applicant's plan to not disturb water bodies located on the proposed project site.

2. WASTEWATER STORAGE PONDS

Wastewater treatment and storage ponds present an opportunity for wildlife, primarily migratory birds, to have direct contact with ISR wastewater. When reviewing Powertech's estimated concentrations of cadmium, chromium, lead, and selenium in ISR wastewater, the NRC found that:

- Concentrations of cadmium, chromium, lead, and selenium exceeded the EPA's long-term chronic exposure-based water quality criteria established for the protection of aquatic life.
- Concentrations of cadmium and lead exceeded EPA's short-term acute exposure-based water quality aquatic life criteria (EPA, 2013a).
- Concentrations of selenium exceeded levels referenced by USFWS (2007) as hazardous to aquatic birds.

A wildlife field study of an ISR wastewater irrigation system observed only limited use of a wastewater storage reservoir by birds (USFWS, 2000b). The EPA concurs with NRC's conclusion that direct chronic and acute exposure of sensitive species to the wastewater could adversely impact exposed individuals, but that exposure would be unlikely because Powertech's proposed wastewater controls and permit conditions that EPA will incorporate into the permit. .

3. LAND APPLICATION SITES

Activities associated with decommissioning land application sites have the potential to impact wildlife. Noise, vehicle and equipment use, and human presence will increase to levels similar to the construction phase for approximately 2 years.

The EPA concurs with NRC's conclusion that there may be a moderate impact on vegetation and wildlife from decommissioning and reclamation under the land application liquid waste disposal option until vegetation has been reestablished and preconstruction wildlife populations return to the area. Potential impact to big game, aquatic species, and amphibians will remain minimal from decommissioning under the land application option for the proposed project.

IV. SPECIES/CRITICAL HABITAT CONSIDERED

On May 1, 2019, the EPA started reviewing the USFWS Section 7 Consultation website called Information for Planning and Consultation (IPaC) for a list of species and critical habitat that may be present within the project area.

Refer To:
Consultation Code: 06E14000-2019-SLI-0318
Event Code: 06E14000-2019-E-00850
Project Name: EPA UIC Dewey-Burdock Permits

The USFWS website was also used to research critical habitats and population for the species that may be present. The eBird Range map (https://ebird.org) recommended by the USFWS website resources section, was also used to research habitat and population for bird species. The following are the three species that may be present inside the project area:

A. NORTHERN LONG-EARED BAT (MYOTIS SEPTENTRIONALIS) - According to the USFWS website, no critical habitat has been reported inside the project area for this species. Our research found no population reports for this species inside the project area. There are no reports of critical habitat for the northern long-eared bat inside the project area. There are no caves or mines reported inside the project area.

B. RUFA RED KNOT (CALIDRIS CANUTUS RUFA) - According to the USFWS website, no critical habitat has been reported inside the project area for this species. According to the eBird Range Map, there are no reports of this species inside the project area.

C. WHOOPING CRANE (GRUS AMERICANA) - According to the USFWS website, no critical habitat has been reported inside the project area for this species. According to the eBird Range Map, there are no reports of this species inside the project area.

V. EFFECTS ANALYSIS

The impacts described below would be applicable at the proposed project site. Project elements are described in "**Part II. Project Description**" of this Biological Assessment. The northern long-eared bat, whooping crane, and rufa red knot are the only consultation species considered to be potentially present at the project site and are the only consultation species that could be exposed to habitat destruction, traffic mortality, noise, contaminants and other disturbances.

1. **Ground Disturbance.** Ground disturbance may impact terrestrial and avian species. Development of the project elements could also disturb vegetation.
2. **Traffic Mortality.** Truck transportation of project materials to and from the project area would significantly increase the amount of truck traffic during the construction phase. This increase in traffic may lead to a marginal increase in traffic-related wildlife mortalities. Less traffic is expected during operation activities.
3. **Noise.** Noise from site construction and operations and from increased truck transport could have adverse impacts on species near the project site. Man-made noise can affect wildlife by inducing physiological changes, nest or habitat abandonment, or behavioral modifications. It may also disrupt communications required for breeding or defense (Larkin 1996). However, wildlife may also habituate to man-made noise (Larkin 1996). Much of the available data on noise effects focus on noise sources that are much more extreme than construction activities, such as aircraft overflights (Efroymson et al. 2000). Consequently, only a general evaluation of potential noise impacts due to the proposed activities is possible without specific knowledge about the locations of species relative to the noise source and without specific data on the responses of these same species to construction noises.
4. **Chemical/Radiological Impacts.** There is potential for adverse effects resulting from wildlife exposure to chemical and radiological constituents. This project includes ponds that may contain wastewater from the mining of Uranium.
5. **Chemical Impacts–Wildlife.** At the project site, wildlife could be exposed to contaminants through ingestion of prey, water, and soil; dermal uptake; and inhalation of airborne contaminants. The primary pathway for wildlife exposure to contaminants would likely be through ingestion of prey in the project area, including the water bodies inside the project area.
6. **Ponds**. Potential impacts that could result from the construction and operation of the ponds include contaminant impacts to wildlife. The ponds could attract wildlife that could be affected due to contaminant exposure through ingestion of contaminated prey and water, dermal uptake of contaminated water and airborne contaminants, and inhalation of airborne contaminants.
7. **Other Disturbances.** Other potential impacts could result from increased human presence during construction and operation activities. Activities and worker presence near the periphery of the project site should be limited to minimize potential harassment of wildlife. If supplemental lighting is used during construction or operation, the lights needs to be directed and/or sheltered to minimize the amount of light escaping the work or project site.

VI. MITIGATION MEASURES

The EPA will incorporate the following measures in the UIC permit to avoid, minimize or mitigate any potential impacts:

- If the whooping crane, the rufa red knot or the northern long-eared bat are sighted within one mile of the well sites or associated facilities during construction or operation, all work within one mile of the species' location must cease, and the Permittee must contact the EPA and the USFWS immediately. In coordination with the USFWS, work may resume after the terrestrial species leave the area.
- Any wells, equipment or buildings associated with the UIC wells authorized under the permit with a fixed location within the project area must be constructed to eliminate openings that look like a small cave or hibernacle to avoid the entrance of any northern long-eared bat.
- In the event that construction is planned during the migratory bird nesting and breeding season, a qualified biologist must conduct pre-construction surveys for migratory birds and their nests within five days prior of the initiation of any construction activities.
- Spills or leaks of chemicals and other pollutants at the UIC well site must be reported to the appropriate regulatory agencies. The procedures of the surface management agency must be followed to contain leaks or spills.
- If supplemental lighting is used during construction or operation, the lights must be directed and/or sheltered to minimize the amount of light escaping the work or project site.
- The Permittee shall install netting, use bird balls or other acceptable bird deterrent method to prevent birds and bats from accessing the ponds.
- Tree removal activities must be conducted outside of the northern long-eared bat active season (April 1 to October 31). This will minimize impacts to northern long-eared bat pups at roosts not yet identified.

VII. CONCLUSION

A. NORTHERN LONG-EARED BAT *(MYOTIS SEPTENTRIONALIS)*

May Affect, Not Likely to Adversely Affect

An unidentified species of bat was observed during the wildlife survey, but it was not determined if it was a northern long-eared bat. No critical habitat has been designated for this species, nor was a critical profile available under the USFWS ECOS website. Since this mammal does not likely live in the project area, no caves or mines are located inside the project area and critical habitat for this species is not found within the project area boundary, the project's effects on the northern long-eared bat will be insignificant, especially with the mitigation measures incorporated in the UIC permit. Powertech (2012) stated the following on Appendix 3.9-A, Baseline Wildlife Report:

- No woody corridors will be disturbed by the proposed activities, and additional trees are present in the cottonwood gallery along the Cheyenne River, located approximately 2 miles south of the permit area, where mining is not projected to occur in the near future.
- Few bats were recorded in the proposed permit area despite targeted efforts to observe them during the baseline surveys. Individuals seen were near water bodies and treed habitats, which are not currently scheduled for disturbance.

Based on the evaluation above, the EPA has determined that the project **may affect, but is not likely to adversely affect** the northern long-eared bat.

B. RUFA RED KNOT *(CALIDRIS CANUTUS RUFA)*

May Affect, Not Likely to Adversely Affect

Rufa red knots were not observed during applicant-conducted surveys and none are reported in the eBirds Range Map inside the project area. Because this species does not live or breed in the project area, and designated critical habitat is not found within the project area boundary, it is unlikely that they will be present. However, the EPA will incorporate mitigations measures into the permit in the unlikely event that the rufa red knot would appear in the project area. Based on the foregoing, the EPA has determined that this project **may affect, but is not likely to adversely affect** the rufa red knot.

C. WHOOPING CRANE *(GRUS AMERICANA)*

May Affect, Not Likely to Adversely Affect

Whooping cranes were not observed during applicant-conducted surveys and none are reported in the eBirds Range Map inside the project area. Because this species does not live or breed in the project area, and designated critical habitat is not found within the project area boundary, it is unlikely that they will be present. However, the EPA will incorporate mitigations measures into the permit in the unlikely event that the whooping crane would appear in the project area. Based on the foregoing, the EPA has determined that this project may affect, but is not likely to adversely affect the whooping crane.

VIII. LITERATURE CITED

eBird.org, (2019). eBird Range Map. Retrieved from: https://ebird.org/map/redkno?neg=true&env.minX=-118.05017819856937&env.minY=40.947871674657&env.maxX=-94.93890008186633&env.maxY=47.468352425275704&zh=true&gp=false&ev=Z&mr=1-12&bmo=1&emo=12&yr=all&byr=1900&eyr=2019

Efroymson, R. A., W. H. Rose, S. Nemeth, and G. W. Suter, 2000. Ecological Risk Assessment Framework for Low Altitude Overflights By Fixed-Wing and Rotary-Wing Military Aircraft, ORNL/TM-2000/289, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Larkin, Ronald P. 1996. "Effects of military noise on wildlife: A literature review," USACERL Technical Report 96/21, January 1996, available at: http://nhsbig.inhs.uiuc.edu/bioacoustics/noise_and_wildlife.txt.

Powertech, (2012). Appendix 3.9-A. Baseline Wildlife Report (PDF). (attached)

Powertech, (2013). 2013 Wildlife Monitoring Dewey-Burdock Project. Prepared By: Thunderbird Wildlife Consulting, Inc. Gillette, WY 82718. (attached)

Regulations.gov, (2016). Endangered and Threatened Wildlife and Plants: Northern Long-Eared Bat; Determination that Designation of Critical Habitat is Not Prudent - Docket No. FWS-R3-ES-2016-0052. Retrieved from: https://www.regulations.gov/searchResults?rpp=25&po=0&s=FWS%E2%80%93R3%E2%80%93ES%E2%80%932016%E2%80%930052&fp=true&ns=true

U.S. Fish and Wildlife Service's (USFWS), (n.d.). Environmental Conservation Online System (ECOS). Retrieved from: https://ecos.fws.gov/ecp/

U.S. Fish and Wildlife Service's (USFWS), (n.d.). Information for Planning and Consultation (IPAC) Retrieved from: https://ecos.fws.gov/ipac/

U.S. Geological Survey (USGS), (n.d.). Gap Analysis. Retrieved from: https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap

U.S. NRC, (2014). Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota; Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (SEIS); Final Report (PDF). Retrieved from: https://www.nrc.gov/docs/ML1402/ML14024A478.pdf

U.S. NRC, (2003). Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NUREG-1748) (PDF). Retrieved from: https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1748/

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